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**13. ABSTRACT (Maximum 200 words)**
A combination of numerical models and field experiments were used to investigate the physical process that effect surface wave properties as theY propagate across the continental shelf to the beach. A spectral refraction wave model was used to study the wave blocking and refraction near the FRF pier at Duck, North Carolina, during SandyDuck. A cross-shelf transect of directional wave buoys was deployed across the North Carolina shelf during the SHOWEX experiment to observe the evolution of the frequency-directional spectrum from the shelf to the beach. A hybrid Eularian-Lagrangian wave model was developed to study the potential role of bottom friction in wave evolution across a broad, shallow shelf.

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Surface Gravity Waves on the Continental Shelf and Beach
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Observed alongshore gradients in wave energy and propagation direction downwave of the FRF pier were modeled using a spectral refraction model. The model overpredicted energy near the pier when waves were propagated over the bathymetric depression beneath the pier. When pier pile blocking was introduced into the model, more accurate predictions were obtained, suggesting pile induced dissipation and scattering may be important. These findings were reported in Elgar, S., R.T. Guza, W.C. O'Reilly, B. Raubenheimer, and T.H.C. Herbers, Wave energy and directional observed near a pier. J. Waterway, Port, Coastal and Ocean Eng., v127, 1-6, 2001.

A cross-shelf transect of directional wave buoys was deployed across the North Carolina shelf from Sept-Dec 1999, during the SHOWEX experiment to observe the evolution of the frequency-directional spectrum from the shelf to the beach. Several large hurricane events were measured by the transect and many complex local wind wave events. Strong wave attenuation was measured during periods of large waves with light winds when swell arrived from offshore hurricane events. Concurrent bottom surveys using side-scan sonar showed extensive ripple bedforms across much of the shelf during these time periods, suggesting that bottom dissipation is important.

A hybrid Eularian-Lagrangian wave model was developed to study the potential role of bottom friction in wave evolution across a broad, shallow shelf. The method combines high spatial resolution, energy conserving spectral refraction methods with traditional, lower spatial resolution Eularian wave energy generation and dissipation numerics. Model simulations that use bottom dissipation rates similar to those found in research literature produced results that were consistent with the observation. The model is described in Ardhuin, F, Herbers, T.H.C., and W.C. O'Reilly, A hybrid Eulerian-Lagrangian model for wave spectra evolution with application to bottom dissipation on the continental shelf, J. Geophys. Res., in press, 2001.